

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

--	--	--	--	--	--	--	--	--	--

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

HPB 3021 – PARALLEL COMPUTING (All Sections/Groups)

07 March 2016
2:30- 4:30 PM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 3 pages, including this cover page.
2. You are required to attempt four (4) out of five (5) questions. All questions carry equal marks (10).
3. Write all your answers in the Answer Booklet provided.

Question 1

a.) What is a *Shell* in the UNIX operating System? What are the types of *Shells* present in UNIX? Explain with at least 2 examples.

[4 marks]

b.) What are the “layers” in the Linux operating system? What is the function of each layer? Which layer is also known as the “shell”?

[4 marks]

c.) What is vi editor in UNIX? What are the commands to save file in vi editor?

[2 marks]

Question 2

a.) List down 4 environmental variables in UNIX OS. What code would you use in a shell script to determine if a directory exists?

[4 marks]

b.) What it means by `#!/bin/sh` or `#!/bin/bash` at beginning of every script ?
List down 2 escape sequence.

[3 marks]

c.) How do you prepare a shell script for execution from the command line prompt?
What is the 2 conversion specifier in *Shell* scripting?

[3 marks]

Question 3

a.) Give a brief definition of the terms "Parallel computing" and "Parallel computers".

[2 marks]

b.) A multi-processor consists of 100 processors, each capable of a peak execution rate of 2 Gflops. What is the performance of the system measured in Gflops when 10 % of the code is sequential and 90% is parallelizable?

[3 marks]

c.) Use an appropriate algorithm to show in detail how parallelism can be used in data clustering.

[5 marks]

Question 4

a.) Flynn's taxonomy is the best known classification scheme for parallel computers. Based on his taxonomy, compare **MISD** (Multiple Instruction – Single Data) with **MIMD** (Multiple Instruction – Multiple Data) types of parallel computers.

[4 marks]

Continued...

- b) Draw shuffle exchange networks with eight nodes. Make sure that you label the nodes based on binary addresses. How many outgoing links every nodes has? Explain the methods for outgoing links calculation.

[6marks]

Question 5

- a) Describe the MPI communicator. What is it? Can there be one or more than one?
[2 marks]
- b) Explain how a communication process is initiated using **MPI_COMM_WORLD** and **MPI_Send** functions. Explain with a suitable example.
[3 marks]
- c) Consider the following MPI program to calculate the value of PI. Describe the purpose of the MPI functions which are underlined

```
MPI Init(&argc, &argv)
MPI Comm size(MPI_COMM_WORLD, &numprocs)
MPI Comm rank
MPI Bcast(&n, 1, MPI_INT, 0, MPI_COMM_WORLD)
MPI Reduce(&mypi, &pi, 1, MPI_DOUBLE, MPI_SUM, 0, MPI_COMM_WORLD);
```

[5 marks]

End of paper.